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THE TESTING OF A REGRESSION MODEL FOR PREDICTING THE PROGRESSION INDEX IN VARIOUS ARMY COURSES

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THE TESTING OF A REGRESSION MODEL FOR PREDICTING THE PROGRESSION INDEX IN VARIOUS ARMY COURSES

John Leo Howlett, Ph.D.

15 October 1976



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18. SUPPLEMENTARY NOTES

The idea for this study was planted during active duty for training of a USAR officer with Project ABACUS. It was completed later for the project and to satisfy a requirement for a staff study, USAC & GSC.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Project ABACUS
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Surveillance & Communications Test (SC)

Progression Index (PI)

Relationship Prediction

20. ABSTRACT (Continue an reverse eide if necessary and identify by block number)

This study was designed to establish whether a relationship exists between the Electronics Aptitude Score (EL), the Surveillance and Communications Score (SC) the independent variables, and the progression index of student learning, the dependent variable. The study was also designed to develop a regression equation for the purpose of prediction of student actual training time based on the two scores, EL and SC. The results could then be used to establish a graduation prediction and subsequent assignment of the student to his unit.

## NOTICES

This report has been reviewed and is approved.

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#### **FOREWORD**

Dr. John Leo Howlett (MAJ, USAR) prepared this study for Project ABACUS and as a part of the course requirements of the US Army Command and General Staff College.

This study was designed to establish whether a relationship exists between the Electronics Aptitude Score (EL), the Surveillance and Communications Score (SC), the independent variables, and the Progression Index (PI) of student learning, the dependent variable. The study was also designed to develop a regression equation for the purpose of prediction of student actual training time based on the two scores, EL and SC. The results could then be used to establish a graduation prediction and subsequent assignment of the student to his unit.

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LTC, SigC

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## TABLE OF CONTENTS

I. INTRODUCTION			
III. STATEMENT OF THE PROBLEM		Pe	ige
III. DEFINITION OF TERMS	I.	INTRODUCTION	1
III. DEFINITION OF TERMS	TT.	STATEMENT OF THE PROBLEM	2
IV. RELATED LITERATURE       4         V. PURPOSE OF THE STUDY       9         VI. NEED FOR THE STUDY       10         VII. LIMITATIONS OF THE STUDY       10         VIII. DESIGN OF THE STUDY       11         IX. ANALYSIS OF THE DATA       12         Phase I.       17         Phase III       21         X. SUMMARY, CONCLUSIONS, AND IMPLICATIONS       25         Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Sumplications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30			
V. PURPOSE OF THE STUDY       9         VI. NEED FOR THE STUDY       10         VII. LIMITATIONS OF THE STUDY       10         VIII. DESIGN OF THE STUDY       11         IX. ANALYSIS OF THE DATA       12         Phase I.       17         Phase III       21         X. SUMMARY, CONCLUSIONS, AND IMPLICATIONS       25         Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30	III.	DEFINITION OF TERMS	3
VI. NEED FOR THE STUDY       10         VII. LIMITATIONS OF THE STUDY       11         VIII. DESIGN OF THE STUDY       11         IX. ANALYSIS OF THE DATA       12         Phase I.       12         Phase III       17         Phase III       21         X. SUMMARY, CONCLUSIONS, AND IMPLICATIONS       25         Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30	IV.	RELATED LITERATURE	4
VII. LIMITATIONS OF THE STUDY       10         VIII. DESIGN OF THE STUDY       11         IX. ANALYSIS OF THE DATA       12         Phase I       17         Phase III       21         X. SUMMARY, CONCLUSIONS, AND IMPLICATIONS       25         Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30	v.	PURPOSE OF THE STUDY	9
VII. LIMITATIONS OF THE STUDY       10         VIII. DESIGN OF THE STUDY       11         IX. ANALYSIS OF THE DATA       12         Phase I       17         Phase III       21         X. SUMMARY, CONCLUSIONS, AND IMPLICATIONS       25         Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30			
VIII. DESIGN OF THE STUDY	VI.	NEED FOR THE STUDY	10
IX. ANALYSIS OF THE DATA       12         Phase I       17         Phase III       17         Phase III       21         X. SUMMARY, CONCLUSIONS, AND IMPLICATIONS       25         Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30	VII.	LIMITATIONS OF THE STUDY	LO
Phase I       12         Phase III       17         Phase III       21         X. SUMMARY, CONCLUSIONS, AND IMPLICATIONS       25         Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30	VIII.	DESIGN OF THE STUDY	11
Phase II       17         Phase III       21         X. SUMMARY, CONCLUSIONS, AND IMPLICATIONS       25         Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30	IX.	ANALYSIS OF THE DATA	12
Phase II       17         Phase III       21         X. SUMMARY, CONCLUSIONS, AND IMPLICATIONS       25         Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30		Phase T	12
Phase III       21         X. SUMMARY, CONCLUSIONS, AND IMPLICATIONS       25         Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30			
Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30			
Restatement of the Problem       25         Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30			
Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30	х.	SUMMARY, CONCLUSIONS, AND IMPLICATIONS	25
Summary of Findings       25         Conclusions       25         Implications       26         Suggestions for Further Study       26         SELECTED REFERENCES       27         APPENDICES       29         Appendix A       29         Appendix B       30		Restatement of the Problem	25
Implications		Summary of Findings	25
Suggestions for Further Study		Conclusions	25
Suggestions for Further Study         26           SELECTED REFERENCES         27           APPENDICES         29           Appendix A         29           Appendix B         30		Implications	26
APPENDICES		Suggestions for Further Study	26
APPENDICES			-
Appendix A	SELE	ECTED REFERENCES	21
Appendix B	APPE	ENDICES	29
Appendix B		Appendix A	29
		••	31

# THE TEST OF A REGRESSION MODEL FOR PREDICTING THE PROGRESSION INDEX IN VARIOUS ARMY COURSES

#### I. INTRODUCTION

"The current thrust of Army thinking and planning in general is to bring about significant increments in training proficiency for a given time period and/or to bring about a given level of proficiency with a significant decrease in training." (Howard, 1975)

In August, 1972, Project ABACUS was begun in order to implement the training objectives of the Army as stated by Col. Howard in the Discussion Guide, CTS Consultants Panel. In October, 1973, the United States Army Signal School (USASIGS) was selected as the prototype test site for the development of a computerized training system (CTS). On November 29, 1973, the Army designated three courses for the operational test of the CTS as follows:

- 1. Field Radio Repair Course (31E20)
- 2. Teletypewriter Equipment Repair Course (31J20)
- 3. Avionics Communications Equipment Repair Course (35L20)
  These courses were selected based on the following criteria:
  - 1. Systems engineered
  - 2. Self paced
  - 3. Multi media
  - 4. Performance oriented

Appendix I contains the topic outlines of the three courses selected for the research project.

Common to all the students entered into the three courses selected were two basic military entrance scores: Electronics Aptitude Test (EL) and Surveilance and Communications Test (SC).

Members of Project ABACUS indicated that these two scores might possibly provide the school with predictive capability regarding the efficiency of student training in reference to time. It was therefore decided that research model be designed which would yield a predictive equation relating student progress with the two independent variables Electronics Aptitude Score (EL) and Surveilance and Communications Score (SC).

#### II. STATEMENT OF THE PROBLEM

This study was designed to establish whether a relationship exists between the Electronics Aptitude Score (EL), the Surveilance and Communications Score (SC), the independent variables, and the progression index of student learning, the dependent variable. The Progression Index (PI) is defined as:

# PI = Actual Training Time - Hours Absent Total Training Time Authorized

The study was also designed to develop a regression equation for the purpose of prediction of student actual training time based on the two scores EL and SC. The results could then be used to establish a Graduation Prediction and subsequent assignment of the student to his unit.

#### III. DEFINITION OF TERMS

The following definitions were included for purposes of standardizing the use of terms in the study. Other terms or phrases used in the study were considered to be self-explanatory.

31E20 - is the course Field Radio Repair

31J20 - is the course Teletypewriter Equipment Repair

35L20 - is the course Avionics Communications Equipment
Repair

CTS - is Computerized Training System

EL - is Electronics Aptitude Score

PI - is Progression Index - a mathematical ratio indicating
the rate of student progress compared to a base course
completion time.

SC - is Surveilance and Communications Score

SPSS - is Statistical Package for Social Sciences

USASIGS - is United States Army Signal School

#### IV. RELATED LITERATURE

There has been much study in regard to prediction of achievement in almost every field of study. In studying the sources of information it was found that in each article there was a significant prediction of success. The conclusions of the author in general were that there was enough increase in correlation with the use of multiple regression procedure to warrant its use for prediction of success. It was also a general concensus of opinion that further study in this area of success prediction was warranted.

Wampler attempted to select measures of aptitude which could be used effectively to predict performance in college mathematics.

The study concerned only the selection of measures for a prediction scheme and not with a factor analysis of ability in mathematics.

(Wampler, 1966) The subjects were chosen from a group of students who had completed ten semester hours of integrated courses in calculus and analytic geometry at Nebraska Wesleyan University. The tests used were taken from the French, Ekstrom, and Price aptitude factors kit (French, 1963) The actual tests chosen were:

X<sub>1</sub> = Location Test

 $X_2$  = Addition Test

 $X_3$  = Division Test

 $X_A$  = Subtraction and Multiplication Test

 $X_{5}$  = Mathematics Aptitude Test

 $X_6$  = Necessary Arithmetic Operations Test

X, ' = Inference Test

X<sub>o</sub> = Wide Range Vocabulary Test

 $X_{9}$  = Cube Comparison Test

X<sub>10</sub> = Match Provlems V

X = Surface Development Test

Each of the tests of aptitude was administered to the subject at the beginning of the school year. Upon completion of the course Mathematics 106, Calculus II, a standardized test in calculus was administered. The eleven aptitude measures were used as prediction variables and the calculus test score was used as the criterion variable. The entire set of scores was submitted to a linear regression analysis utilizing an IBM 1620 digital computer with a program written

by Griffith. (Wampler, 1963) The best combination of variables proved to be: Location Test, Division Test, Inference Test, Wide Range Vocabulary Test and Cube Comparison Test. The multiple correlation coefficient for this combination had the value .9502 which differed significantly from zero at the 1 per cent level and the regression equation for the best combination of these five variables was Calculus Test score equals .4209X<sub>1</sub> - (.1498X<sub>3</sub>) + .8930X<sub>7</sub> + .8238X<sub>8</sub> - .1601X<sub>9</sub> + 4.496. Prediction of performance on the standardized calculus test using the aforementioned regression equation should not be wrong by more than 3.176 points in approximately two-thirds of the predictions one might make.

The results of this study indicated that measures of aptitude can be used effectively to predict achievement in college mathematics.

The purpose of the test conducted by Hulser and Smith (Hulser, 1963) was to find some means of predicting general grade point average of freshmen after one quarter of college work at Central Missouri State College. The experiment served a twofold purpose: The first step was to determine the validity of each of the tests of the freshman battery for predicting first quarter grade point average.

The second aspect of the study was to determine whether a combination of two or more variables would produce a sufficient increase in validity to justify the use of multiple regression procedures.

The procedure began with the administration of the freshman battery consisting of the School and College Aptitude Test (SCAT) and the Missouri English Placement Test (MEPT). The high school percentile rank was also used in this combination. College grade point average computed from the first quarter grades served as the criterion

measure. All possible intercorrelations were computed between predictors as well as the criterion variables. The best single predictor of grade point average proved to be the high school rank, with a correlation of .6000.

In the second phase of the study, use was made of all possible combinations of tests. The best possible combination using linear regression procedures proved to be the use of the SCAT, verbal, and Quantitative MEPT and high school rank with a correlation of (.686). But since the combination of the SCAT total score and the high school rank was .671, only .015 less than the best possible combination, and the addition of each predictor does add a source of error, it was decided to use the regression equation:

 $Y = .017133X_1 + .013829X_2 - .110$  where

Y = Predicted grade point average

X = Total SCAT score

 $X_2$  = High school rank

The experiment did show that multiple regression procedures can improve prediction of grade point averages using SCAT, MEPT and high school grade point averages. Stiles and Williams at Vanderbilt University School of Engineering wished to find a means to select from among the applicants, those students having the best chance of success in college. (Stiles, 1963) Eight prediction variables were selected.

- I. CEEB College Entrance Examination Board

  Scholastic Aptitude Tests Verbal Battery

  Score
- II. CEEB College Entrance Examination Board
  Scholastic Aptitude Tests Mathematics
  Battery Score

III.	CEEBT	-	College Entrance Examination Board
			Scholastic Aptitude Tests - total score -
			CEEB <sub>T</sub> + CEEB <sub>M</sub>
IV.	IQ	-	Intelligence Quotient high school age
			levels, based on a mean of 100 and
			standard deviation of 15
v.	HSGP	-	High school grade point average based on
			a 3.0 system
VI.	HS RA	-	High school percentile rank in class
VII.	Age	-	The age of applicant of September, 1959
VIII.	HS RE	-	High school recommendations
			The high school principal or counselor was
			required to write a recommendation for
			each applicant. Means of prediction were:
			+1 - Student was given a positive
			recommendation by the high school
			0 - student given neutral recommendation
			or no recommendation
			-1 - student given a negative recommendation
IX.	G.P.A.	-	Criterion variable grades were computed
			from college grades using the same basis as

that for high school G.P.A.

The authors were quite interested in the fact that the high school ratings by the principal or counselor proved to be of significant value. In fact, the authors recommended an improvement on the rating scale to increase the predictability. This scale would use the ratings: 5, superior college student; 4, good student material; 3, student has minimum qualifications for college; 2, there is doubt of success of the student in college work; 1, student is not qualified to do college work.

The purpose of a study by Ivanoff and DeWane was to determine whether on the basis of certain available criteria, it was possible to discriminate between students who successfully completed ninth-grade algebra and those who completed the general mathematics program. (Ivanoff, 1965) This study differed from previous investigations of the problem not only with regard to the variable under scrutiny but also with the design. The subjects were taken from a large midwestern suburban non tax supported high school open to male students. The group was divided into 286 algebra students and 162 general mathematics students. The variables selected were: I.Q. rating, reading, arithmetic, language, and composite scores from the High School Placement Test (HSPT) and eighth grade mathematics marks. Grades were based on A-5, B-4, C-3, D-2, F-1. The hypothesis tested was that there is no significant relationship between the two groups and the prediction variables adopted.

The design of the experiment was set up as a regression scheme using a dichotomous variable rather than the usual numerical variable. Thus because the usual regression procedure was not appropriate an adaptation of the Fisher discriminant analysis was

made. (Fisher, 1936) Data was processed by an IBM 1620 digital computer using a two group multiple variable stepwise discriminant analysis.

The result of the experiment indicated that there was a significant difference between the two groups and that prediction could be made as to the success of students in the two groups. The prediction equation was  $z_{AM}$  + -.01255 $x_2$  - .02333 $x_3$  - .00250 $x_5$  - .09246 $x_6$  + 1.75442 where  $z_{AM}$  = The algebra general mathematics prediction score

 $x_2 = (HSPT)$  Reading

 $X_3 = (HSPT)$  Arithmetic

 $X_5 = (HSPT)$  Composite

X<sub>6</sub> = 8th grade class work

In prediction, if the Z score was negative it predicted achievement in Algebra whereas a positive score predicted achievement in General Mathematics. It was further pointed out the students found to be on the border line could be counselled in such a way that they would understand and be encouraged to "beat the odds" through diligent study and work habits.

#### V. PURPOSE OF THE STUDY

The purpose of this study was to develop a predictive equation which would adequately provide a training school with a tentative student training completion time. This predictive equation was to be dependent on a criterion based training program utilizing self-paced instruction techniques.

#### VI. NEED FOR THE STUDY

A systematic approach to education designed to increase training efficiency and decrease training time requires a specific prediction capability so that control on expected student progress can be met. The primary purpose of project ABACUS is to establish a training system which will bring about a given level of proficiency with a significant decrease in training time. Data has been collected from various courses taught by means of self-paced instruction. For each student completing a course, a progress index has been computed. A basic assumption is that instruction under project ABACUS will provide at least the same minimal progression index for a student with a similar background as found under self-paced instruction. Therefore it is essential to establish some viable predictive equation which might indicate the Progression Index for students utilizing the Computerized Training System (CTS).

#### VII. LIMITATIONS OF THE STUDY

Although this study was established to develop a predictive equation for student training under project ABACUS, the author was limited to the use of two variables as a means of developing the regression model.

- 1. Electronics score
- 2. Surveilance and communications score

The research model also limited itself to the three courses chosen for the Project ABACUS model.

- 1. Field Radio Repair (31E20)
- 2. Avionics Communications Equipment Repair (35L20)
- 3. Teletypewriter Equipment Repair Course (31J20)

#### VIII. DESIGN OF THE STUDY

The primary purpose of this study was to find a means of predicting course completion time of students entering into three courses:

- 1. Field Radio Repair (31E20) 197 students
- 2. Teletypewriter Equipment Repair (31J20) 299 students
- 3. Avionics Communications Equipment Repair (35L20) 118 students

  The criterion or dependent variables used in the study was defined according to the following:

PROGRESSION INDEX (PI)

## PI = ACTUAL TRAINING TIME - HOURS ABSENT TOTAL TRAINING TIME AUTHORIZED

The design of the experiment required that the data used as the independent variables be the EL and SC scores found in the serviceman's entrance folder. It would have been desirable to include variables which measured emotional adjustment, interest inventory and attitude toward learning, but no such information was available. The prediction equations were therefore based solely on the EL and SC scores.

The basic design of the experiment included a three phase study. The first phase was the study of predictability of student progress in the course 31E20. The population included 197 graduates who completed the course during the period August 1974 through December 1975.

The second phase included the predictability of the student progression index in the course 31J20 and included 299 students who completed the course during the period August 1974 through December 1975.

Phase III utilized the regression model for the 35L20 courses and included 118 students who were enrolled during the period August 1974 through December 1975.

The data for all three phases was accumulated and then processed by The University of Wisconsin, Green Bay, utilizing the Statistical Package for Social Sciences (Nie, 1975). The experiment utilized Multiple Linear Regression Analysis to establish a best fit use of the independent variables to establish a predictive Progression Index (PI). The 5% level of confidence was used in the nul hypotheses.

There were three nul hypotheses tested:

- H 1. There was no multiple correlation of the independent variables EL and SC with the dependent variable PI in the course 31E20.
- H 2. There was no multiple correlation of the independent variables EL and SC with the dependent variable PI in the course 31J20.
- H 3. There was no multiple correlation of the independent variables EL and SC with the dependent variable PI in the course 35L20.

#### IX. ANALYSIS OF THE DATA

#### Phase I

Phase I was designed to establish whether or not the combination of the two scores EL and SC could, by means of linear regression methods, predict the Progression Index of a student in the course 31E20. The parent population for this phase consisted of 197 students who had graduated from the United States Army Signal School course, Field Radio Repair during the period August 1974 through December 1975.

The investigation utilized a linear regression model and management of the procedure was accomplished by the use of the Statistical Package for Social Sciences (SPSS). The nul hypothesis tested was:

H 1. There was no multiple correlation of the independent variables EL and SC with the dependent variable PI in the course 31E20.

Computations were performed which gave the arithmetic averages, the variance and the correlations of the independent variables with the dependent variables (Table 10).

Table I
Course 31E20
Means, Standard Deviation, and Correlations with PI

Variables	Cases	Mean	Std. Dev.	<u>R</u>
El	197	113.502	13.242	375
SC	197	107.162	15.819	250
PI	197	.85	.1953	1

the two independent variables EL and SC. As indicated in Table II, the regression multiple R (.37534) did not substantially improve over that of the simple R established in Table I. The F ratio for the regression model 15.907 with degrees of freedom at 2,194 was found to be significant at the 5% level of confidence. We, therefore, reject the nul hypothesis and conclude that there was no rultiple correlation of the EL and SC scores with that of the PI. In order to establish the possibility of a non linear relationship, the data was plotted by means of a scattergram to identify possible linear transformations which would establish a viable regression model. One hundred data points were randomly selected and plotted and the results (Table III and Table IV) indicate a shotgun

pattern. The scattergrams indicate little likelihood of any possible predictability of PI through the use of the EL and SC scores.

Table II Multiple Regression Analysis (31E20)

Mu	9	-	å,	ni	م (	-	D
MAL		ъ.	ж.	<b>W</b> .	LC		г.

.37534

R-Square

.14088

Adjusted R-Square .13648

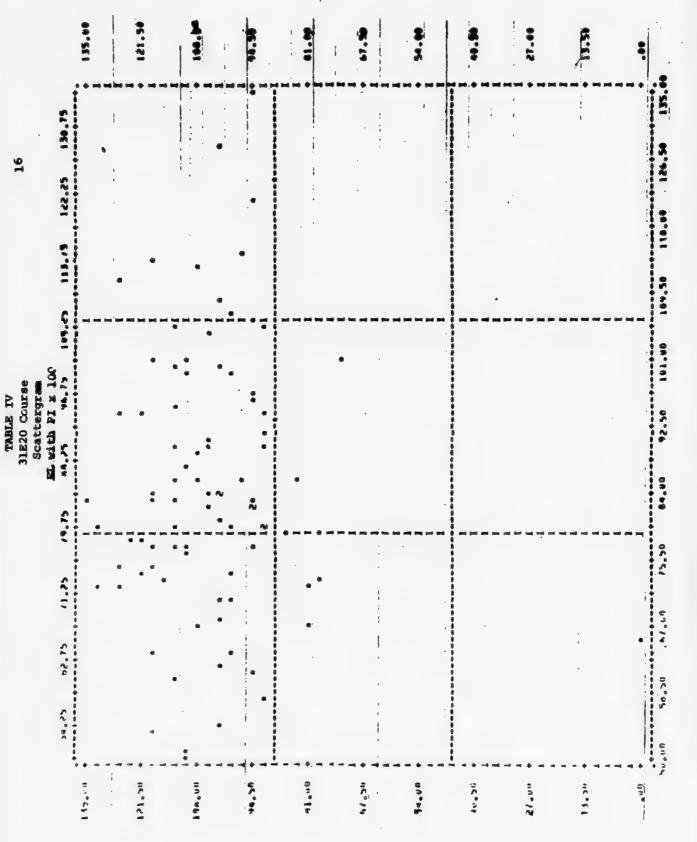
Standard Error

18.19388 4

## Variables in the Equation

Variable	В	•	Beta	Std. Error B	<u>F</u>
V2	58552	97	~.3970399	.1391042	17.7181
Δ3	3.89462	08E-02	3.1547278E-02	.1164471	.1119
(Constant)	147.285	5			
Analysis of V	ariance	DF	Sum of Squares	Mean Square	F
Regressi	.on	2	10530.655	5265.3273	15.90650
Residual		194	64217.345	331.01724	

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#### Phase II

The second phase was designed to establish whether or not the combination of the serviceman's two scores EL and SC could, by means of linear regression techniques, predict the progression index of a student in the course 31J20. The parent population for phase was made up of 299 students who had graduated from the United States Army Signal School course Teletypewriter Equipment Repair during the period August 1974 through December 1975.

This investigation utilized a linear regression model and management of the procedure was accompaished by use of the SPSS package. The null hypothesis tested was:

H 2. There was no multiple correlation of the independent variables EL and SC with the dependent variable PI in the course 31J20.

Computations were performed which gave the arithmetic averages, the variance, and the correlation of the independent variables with the dependent variables (Table V). Table VI contains the results of the

Table V
Course 31J20
Means, Standard Deviation, and Correlations with PI

<u>Variable</u>	Cases	Mean	Std. Dev.	<u>R</u>
EL	299	111.120	12.836	1707
SC	299	107.498	14.036	1222
PI	299	.7529	.181	,

regression model utilizing the two independent variables EL and SC. As indicated in Table VI, the regression multiple R (.17065) did not substantially improve over that of the simple R established in Table V. The F ratio for the regression model 4.439 with degrees of freedom at 2,296 was found to be significant at the 5% level of confidence.

We, therefore, reject the null hypothesis and conclude that there was no multiple correlation of the EL and SC scores with that of the PI in the course 31J20. In order to establish the possibility of nonlinear relationship, the data was plotted by means of a scattergram to identify possible linear transforms which would establish a viable regression model. Table VII and Table VIII indicate no basic transforms identifiable. The shotgun pattern indicates no likelihood of predictability of the PI by use of the EL and SC scores.

Table VI Multiple Regression Analysis (31J20)

Multiple-R	.17065
R-Square	.02912
Adjusted R-Square	.02585
Standard Error	15.00826

## Variables in the Equation

Variable	<u>B</u>		Beta	Std. Error B	F
V2	202258	8	1710223	9.7214340E-02	4.3287
V3	5.578244	6E-04	5.1576008E-04	8.8904877E-02	.0000
(Constant)	97.70274				
Analysis of V	ariance	DF	Sum of Squares	Mean Square	F
Regressi	.on	2	1999.9269	999.96345	4.43939
Residual		296	66673.337	225.24776	

TABLE VIII
31J20 Course
Scattergram
EL with PI x 100

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#### Phase III

Phase III was designed to establish whether or not the combination of the serviceman's two scores EL and SC would, by means of linear regression techniques, predict the progression index of a student in the course 35L20. The parent population for this phase was made up of 118 students who had completed the 35L20 course at the United States Army Signal School during the period August 1974 through December 1975.

This investigation utilized a linear regression model and management of the procedure was accomplished by use of the SPSS package. The null hypothesis tested was:

H 3. There was no multiple correlation of the independent variables EL and SC with the dependent variable PI in the course 35L20.

Computations were performed which gave the arithmetic averages, the variance and the correlation of the independent variables with the dependent variable in the 35L20 course (Table IX). Table X contains the results of the regression model utilizing the two independent variables EL and SC. As indicated in Table X the regression multiple R (.2546) did not show substantial improvement over that of the simple R established in Table IX. The F ratio for the regression model 3.986 with degress of freedom at 2;115 again was found to be significant at the 5% level of confidence (F at 5% is 3.09). The scattergrams Tables XI and XII indicate the typical shotgun pattern and thus no attempts were made to establish linear transforms for the regression model.

Table IX
Course 35L20
Means, Standard Deviation, and Correlation with PI

Variable	Cases	Mean	Std. Dev.	<u>R</u>
EL	118	119.390	12.293	2206
sc	118	114.000	12.293	2480
PI	118	.93	.2111	

Table X Multiple Regression Analysis (35L20)

Multiple-R	. 25463
R-Square	.06483
Adjusted R-Square	.05677
Standard Error	20.59076

## Variables in the Equation

Variable	B		Beta	Std. Error B	F
V2,	1384431		-8.4618876E-02	.2160202	.4107
V3	3197061		1861723	.2267390	1.9882
(Constant)	146.9582				
Analysis of	Variance	DF	Sum of Squares	Mean Square	F
Regress	ion	2	3380.3527	1690.1764	3.98646
Residua	1	115	48757.613	423.97925	

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TABLE XI 35L20 Course Scattergram SC with PI x 100	94.50					•	• •				
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#### X. SUMMARY, CONCLUSIONS, AND IMPLICATIONS

#### Restatement of the Problem

The study was initiated to ascertain whether or not the basic soldier's entrance scores, the Electronics Score and the Surveilance and Communications Score, can be used to predict the rate of course completion and thus predict the course completion time of the soldier in various signal courses at the United States Army Signal School.

## Summary of the Findings

The study was devided into three phases which analyzed the use of a multiple regression model on the three courses:

31E20 Field Radio Repair

31J20 Teletypewriter Equipment Repair

35L20 Avionics Communications Equipment Repair

In all three phases the analysis of the data indicated that there was no multiple linear relationship between the Progression Index, the dependent variable, and the EL and SC scores, the independent variables. Scattergrams of the data also indicated little or no possibility of the use of linear transforms for prediction improvement.

#### Conclusions

The results of this study indicate that the use of the Electronics Score and the Surveilance and Communications Score for the prediction of courses completion time under self-paced instruction is not warranted. Further, the use of multiple linear regression methods does not improve the possibility of use of these two variables for prediction of the Progression Index.

## Implications

The results of this study show that though multiple regression techniques do provide a means of predicting program success, the use of the scores EL and SC do not indicate the rate of progression in a self-paced method of learning. Apparently self-paced learning is not dependent on aptitude type scores.

Suggestions for Further Study

The following are suggestions for further study:

- This study indicates that further search for predictive type variables is needed to establish a student progression prediction equation.
- 2. Further study should be undertaken to identify the causes of self-paced ra\*es of criterion learning. Apparently causes are quite diverse and vary greatly with the individual.
- 3. There is a possibility that the use of early subcourses could produce a highly predictive equation of final completion time of self-paced criterion courses.

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#### APPENDIX A

## Field Radio Repair

## 31E20

Equipment	Time
RT 841/PRC-77 (T/S)	87
RT 841/PRC-77 (Align/Adjust & F/T)	54
OA-3633	36
RT-524/VRC	59
RT-246/VRC	69
AN/GRC-142	68
RT-662/GRC (T/S & repair)	56
RT-662/GRC (Align)	50
RT-662/GRC (F/T)	33
AMP 3349/GRC-106 (T/S)	25
AMP 3349/GRC-106 (Align/adjust)	23
AMP 3349/GRC-106 (F/T)	24
MD-522 A/GR (T/S)	21
MD-522 A/GR (Align/adjust)	45
Final Shop (Not tested)	42 695
	693

695 hrs - 19 weeks
Cobet - 6 weeks
TOTAL 25 weeks

T/S = Troubleshoot F/T = Final Test APPENDICES

## APPENDIX C

## Avionics Communications Equipment Repair

## 35L20

Equipment	Time
AN/ARC-134 (T/S)	78
AN/ARC-54 (T/S)	26
AN/ARC-54 (F/T)	13
AN/ARC-131 (Align)	7
AN/ARC-131 (Adjust)	7
AN/ARC-131 (T/S)	17
C-1611/AIC (T/S)	7
AN/ARC-114	35
AN/ARC-115	32
AN/ARC-116	32
AN/ARC-51BX (Align)	34
AN/ARC-51BX (T/S)	49
AN/ARC-51BX (F/T)	11
AN/ARC-102 (T/S)	72
AN/APX-72 (Align)	19
AN/APX-72 (T/S)	68
, -,	507

507 hrs - 14 weeks . Cobet - 8 weeks TOTAL 22 weeks

T/S - Troubleshoot F/T - Final Test

## APPENDIX B

## Teletypewriter Equipment Repair Course

## 31J20

## Proposed POI Content and Time

Equipment	Time
TT-4	94
AN/FGC-20	50
AN/FGC-159	38
TT-76	60
AN/FGC-161	85
AN/FGC-58	89
AN/FGC-80	100
AN/MGC-17	27
•	543

543 hrs - 15 weeks Cobet - 6 weeks 21 weeks